40p

Printout No 13

Fortnightly December 8 – December 21 1983

LOAD RUNNER

THE GALAXY'S FIRST COMPUTER COMIC

IF THIS WAS REALLY THE WILD WEST, THE SUN WOULD BE HARSH AND SCOWLING IN THE SKY. BUT FOR **LOAD RUNNER**, TRAPPED INSIDE A HUGE **COMPUTER**, THERE IS NO SUN... AND, CAUGHT IN A SERIES OF **DEADLY GAMES**, LITTLE HOPE...

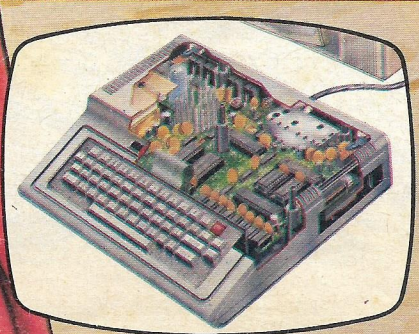
OKAY, STRANGER... IF YOU'RE READY, **DRAW!!**

AND **PETRA HAWKE**, LOAD RUNNER'S HUMAN COMPANION, CAN ONLY WATCH HELPLESSLY...

HOW CAN LOAD RUNNER OUTDRAW AN **ANDROID?**

WELCOME TO SIMIAN'S WORLD

COMPUTER PIN-UP



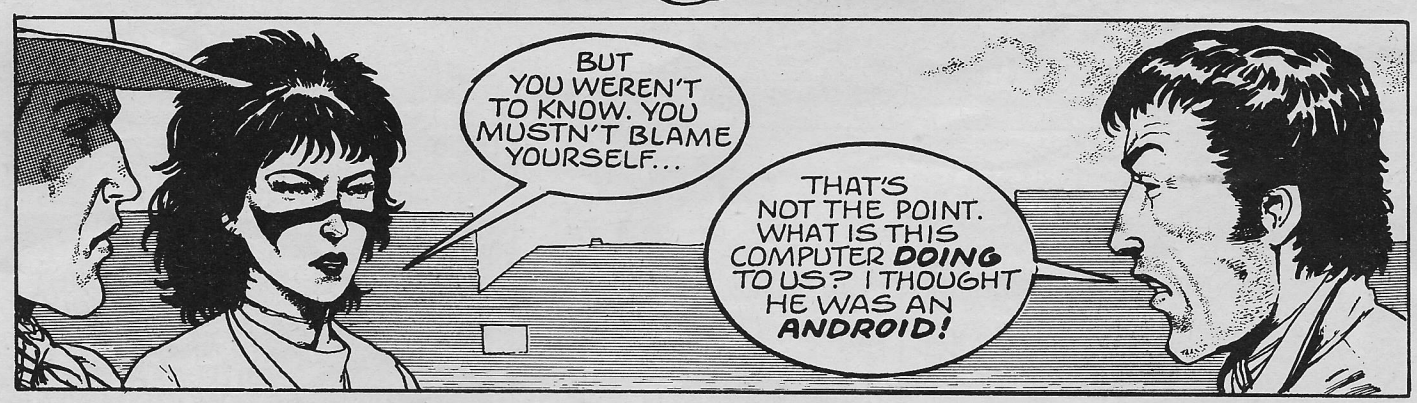
TROUBLE ON THE TERRACES

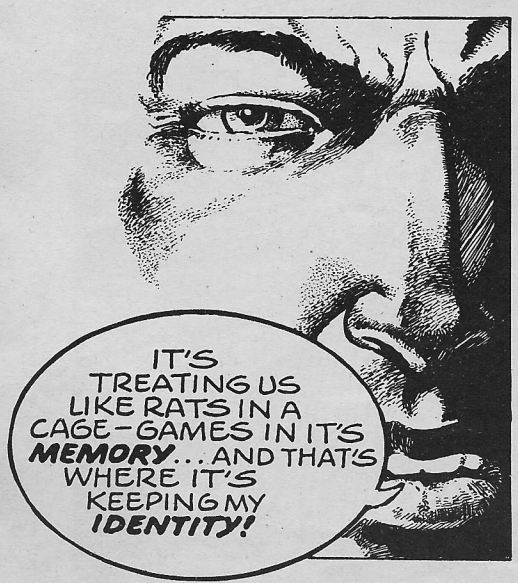

THEN LOAD RUNNER MOVES LIKE LIGHTNING!
CHEW ON THIS, TIN MAN!
WHA-?
MY CRASH GUN... HAD NO EFFECT!
SALOON
ELSEWHERE, THE COMPUTER OBSERVES THE DUEL WITH INHUMAN DETACHMENT...
=GAME DIFFICULTY MAXIMUM.
=NEW VALUES ENTERED FOR ALL VARIABLES.
GOT TO GET BEHIND THIS STAGECOACH OR I'M DONE FOR!
C'MON, YUH CRITTER... AIN'T NO GOOD HIDIN'!
MY CRASH GUN SHOULD HAVE REDUCED THAT ANDROID TO SCRAP. THE POWER CELL MUST BE EXHAUSTED. BUT THERE'S ONE CHANCE...
THINKING QUICKLY, PETRA GIVES LOAD RUNNER THAT CHANCE...
HEY, METAL MICKEY! YOU COULDN'T HIT A BARN DOOR!
HUH?

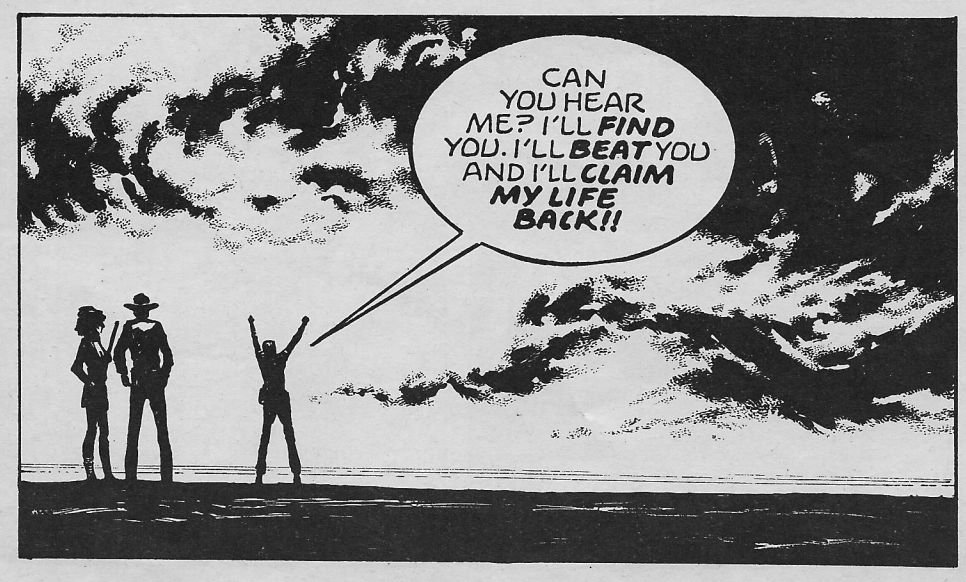

NICE ONE, PETRA.
EAT LEAD, TIN RIBS!
BIN 39710
= GAME OVER. NEW PROGRAM RUNNING...
= DESPATCH MEDIC UNIT.
RIP
SCRIPT
STEVE CRADDOCK
ARTWORK
PETER DENNIS
LETTERS
MICK HOLLINGWORTH


PRETTY GOOD SHOOTING, FELLA.
WHO THE-!
IT IS THE MYSTERIOUS FIGURE ENCOUNTERED BY LOAD RUNNER TWICE PREVIOUSLY...
CAREFUL WHERE YOU POINT THAT THING! YOUR ANDROID GUN WOULDN'T HURT ME, BUT THAT RIFLE WOULD!

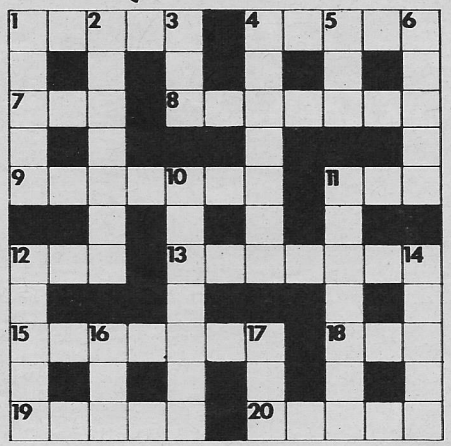

...IN THE DEADLY CHESS GAME AND LATER, IN THE DOGFIGHT.
YOU! I WAS BEGINNING TO THINK WE'D LOST YOU IN THE GAMES!
WELL, WE MEET AGAIN. NOW WE CAN WORK TOGETHER.
LOAD RUNNER! QUICK!!
THE GUNMAN – HE'S BLEEDING! HE'S HUMAN!
YOU'RE RIGHT, AND HE'S BARELY ALIVE!... NO WONDER MY CRASH GUN WAS USELESS. IT ONLY WORKS ON ARTIFICIAL CONSTRUCTS.
DON'T YOU UNDERSTAND? I'VE ALMOST KILLED HIM!


BUT YOU WEREN'T TO KNOW. YOU MUSTN'T BLAME YOURSELF...
THAT'S NOT THE POINT. WHAT IS THIS COMPUTER DOING TO US? I THOUGHT HE WAS AN ANDROID!


IT'S TREATING US LIKE RATS IN A CAGE – GAMES IN IT'S MEMORY... AND THAT'S WHERE IT'S KEEPING MY IDENTITY!


CAN YOU HEAR ME? I'LL FIND YOU. I'LL BEAT YOU AND I'LL CLAIM MY LIFE BACK!!

Wordplotter 13



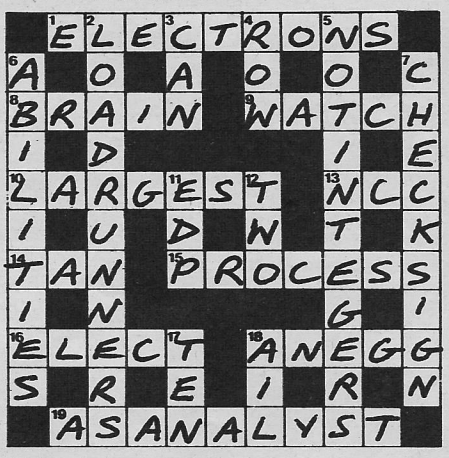
Across

1. A hundred exist for Britain's computing uncle (5)
4. Arrays on fighting-ground for processor (5)
7. Last statement some micros need (3)
8. Sheet of paper and insect make a colourful display (7)
9. Main constructional material of a micro (7)
11. Where the posh printer goes to sleep? (3)
12. Catch this vehicle carrying data! (3)
13. What to do to a mystery game (5,2)
15. You must do this when playing Adventure . . . (7)
18. . . . though this will help unlock the secrets (3)
19. 1,024×8 bits (5)
20. Lovingly looked after the equipment (5)

Down

1. Best adjective for the products of 1 across (5)
2. They really had to fight Space Invaders in America (7)
3. Electronic data processing (3)
4. Like Mr Spock, computers are (7)
5. Where to play a game of Pirates (3)
6. Dates mixed up when fed up with computing (5)
10. Data function of any computer (2,5)
11. A CB user . . . (7)
12. . . . and the key to press for a relaxing drink (5)
14. Played with a video game computer (5)
16. Employees are glad computers work this out (3)
17. The Common Market (3)

Wordplotter 12 Solution



Wordplotter 13 Solution overleaf

Great Trumbull

I TOTALLY DISAGREE with the reader who said Trumbull's World was boring. On the contrary, Trumbull's World was a very good story, as is Load Runner. School for Software was excellent — much better than the previous Time Plan 9. I would rate all stories 10/10 at present, apart from Rom & Ram. Never have I found a comic which has so many excellent stories.

Farid Howladar, 13, London E11

Only the best

I THINK *Load Runner* is the best (and only) computer comic in the world! I don't yet have a computer but might be getting one for Christmas. *Load Runner* is a bit expensive, but it's quality that counts and there is plenty of it. Personally I'd buy it every day if I could.

Mark Murphy, 12, Peterborough

Useful data

IN PRINTOUT NO 11 you state: "The Golden Baton is different from most other adventure games as it uses high-resolution graphics, and no text to describe the situations you are in". This is not true. If, when in high-resolution mode, you press the 'Enter' key the picture will disappear, and the adventure continues in the normal way. I hope this information is of use to you.

A Load Runner reader

I am sure that other readers will be grateful for that data and the oversight on the part of my operators will not happen again.

Hurrah!

CONGRATULATIONS on the continuation of your computer comic *Load Runner*. We have bought each copy you have issued since the comic started in June. Hurrah for *Load Runner* and its competitions!

Rachael Felstead (Mum) and Thurstan Felstead, Middlesex

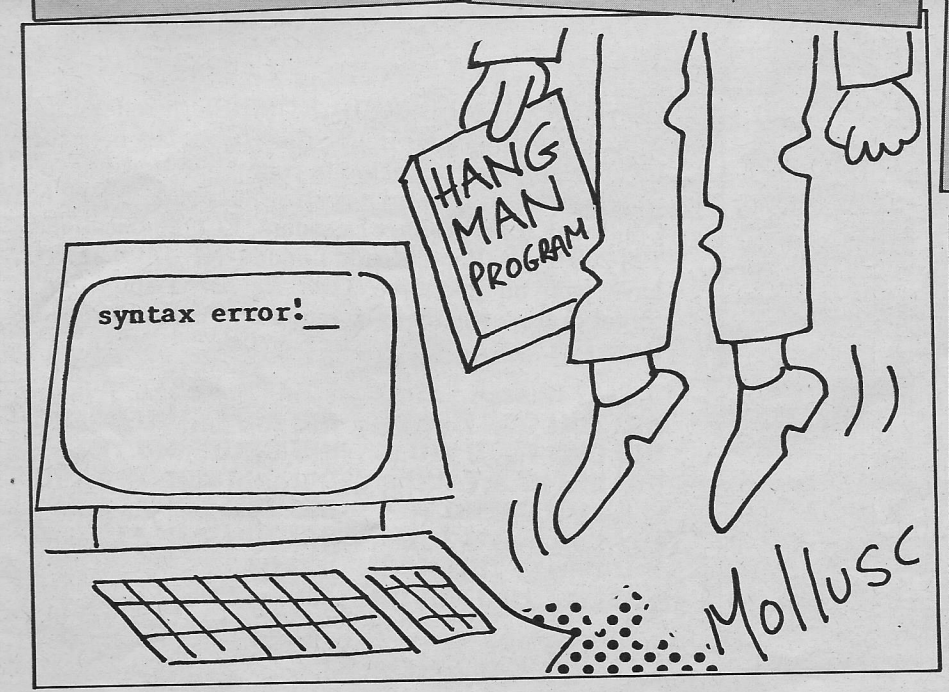
Program ERROR

PAUL LEATHLEY'S Texas TI99/4A program in *Load Runner* Printout No 10 did not run correctly. I suggest the following line corrections:

320 call color (G,12,2)
410 for I=2 to 14 step 2
460 Z=77
1220 Input "your initials":B$

This should now be all right!

Steven Gillingham, 11, Leicestershire



Computajokes

WHY did the computer RUN across the road?
To ENTER the CHIP shop!
Which computer has a negative attitude?
The Electron!
Which computer is connected with the theatre?
The Old Vic!

Robert Moody, Sidcup, Kent

Competition Winners

Below are the winners of the Computer War Competition in Printout No 11.

Daniel Symonds, 12, Truro, Cornwall
Derren Ward, 12, Rotherham, S. Yorks
Richard Heading, 10, Southampton
John Cotton, 11, Great Yarmouth
Andrew Spencer, 14, Erdington, Birmingham
Daniel Rogers, 12, Halesworth, Suffolk

The lucky winners

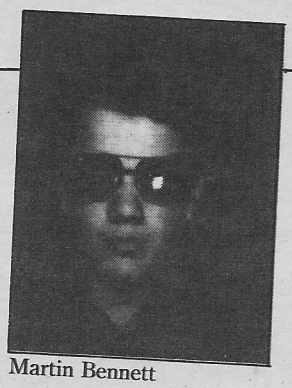
DISPLAYED on this page are the photographs of the lucky Decoders who have claimed their prizes. Many Decoders, however, have not claimed their prizes, and their numbers are listed at the bottom of the page.


Michelle Winshow


Nick Allgood


David Isherwood


John Breedon


Martin Bennett


Andrew Colver


Anthony Kirke


Elanor Ferguson


Robert Edmonds

Wordplotter 13 Solution

1C	L	2I	V	3E	■	4L	I	5S	T	6S
H	■	N	■	D	■	O	■	E	■	A
7E	N	D	■	8P	A	G	E	A	N	T
A	■	I	■	■	■	I	■	■	■	E
9P	L	A	S	10T	I	C	■	11B	E	D
■	■	N	■	O	■	A	■	R	■	■
12B	U	S	■	13S	O	L	V	E	I	14T
R	■	■	■	T	■	■	■	A	■	O
15E	X	16P	L	O	R	17E	■	18K	E	Y
A	■	A	■	R	■	E	■	E	■	E
19K	B	Y	T	E	■	20C	A	R	E	D

Have you claimed your prize?

IS YOUR MEMBERSHIP NUMBER listed in the coded printout below? If it is, this is your last opportunity to claim your prize. Write your name, address and membership number on a postcard and post it to: The Controller, *Load Runner* Decoders, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ. If you have won an exclusive *Load Runner* T-shirt don't forget to state whether you require a small, medium or large size.

T-Shirt Winners

IHU ZULI QWI HAHU
IHU QWI TAVU IHU
IHU IHU NAX TAVU
IHU ZULI UAERQ TISL
IHU QWI TAVU ZULI
IHU QRLUU ZULI HAHU
IHU ZULI ZULI NUVUH

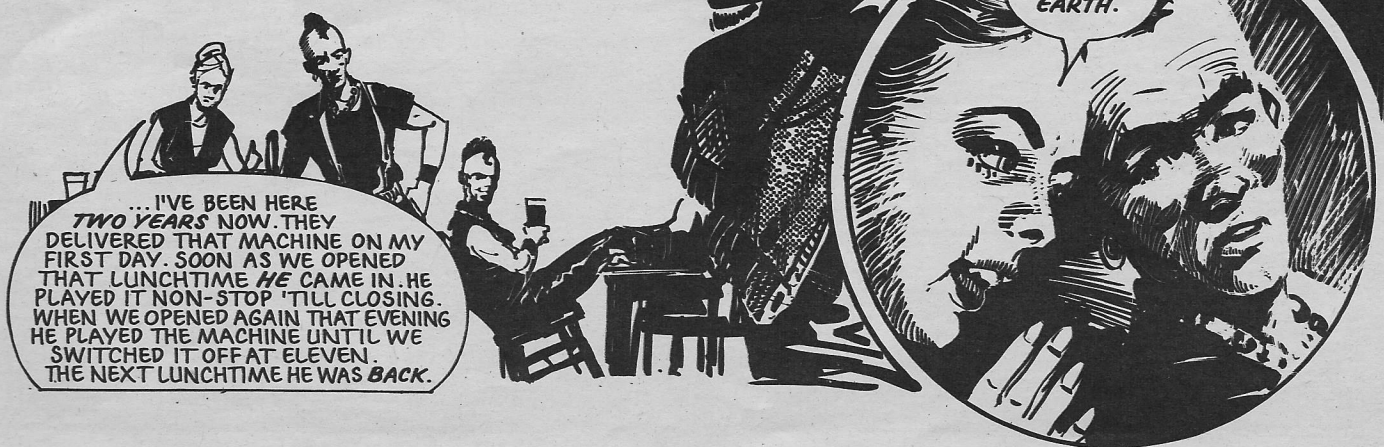
Mainframe album Winners

IHU IHU QRLUU UAERQ
IHU QRLUU IHU TISL
IHU QWI NUVUH TAVU
IHU ZULI QRLUU ZULI
IHU ZULI HAHU UAERQ
IHU QWI TAVU NUVUH
(Keyword No 1)


DEFENDER


HOW LONG'S HE BEEN PLAYIN' THAT THING, COL?
INVADERS
GORRA BE AN HOUR. AT LEAST!
THOUGHT SO.


OI, LOVE! DON'T THAT GUY EVER STOP? SOME OF US WOULDN'T MIND A GAME AS WELL! YOU GOT SOMETHIN' AGAINST STRANGERS?
NO, LOVE, 'COURSE NOT. IT'S JUST THAT ... WELL...


... I'VE BEEN HERE TWO YEARS NOW. THEY DELIVERED THAT MACHINE ON MY FIRST DAY. SOON AS WE OPENED THAT LUNCHTIME HE CAME IN. HE PLAYED IT NON-STOP 'TILL CLOSING. WHEN WE OPENED AGAIN THAT EVENING HE PLAYED THE MACHINE UNTIL WE SWITCHED IT OFF AT ELEVEN. THE NEXT LUNCHTIME HE WAS BACK.
HE SAYS HE'S SAVING THE EARTH.


AN HOUR AND A HALF LATER...
I'VE HAD ABOUT ENOUGH OF THIS, COL. THAT WEIRDO'S BEEN PLAYIN' THAT GAME FOR AGES!
ARE YOU THINKIN' WHAT I'M THINKIN'?
YEAH. LET'S GO.
INVADERS
FANCY A BREAK?
GOOD GAME, MATE?
NO. I CAN'T ...NOT YET...
THAT'S A SHAME...
NOW, LADS...
RELAX, LOVE. THIS'LL ONLY TAKE A MINUTE.
LESS.
...A REAL SHAME!
OH!
EXCUSE MY BOOT!
YEAH, WE KNOW.
NO! YOU DON'T UNDERSTAND! I HAVE TO SAVE THE EARTH!
JUST RELAX, PAL. STEVE'S PRETTY GOOD AT THIS.
BOYS!
SCRIPT- HUNTER TREMAYNE
ARTWORK- JOHN CANNING
LETTERS- STEVE POTTER


THIS IS A DOODLE. JUST 200 TO WIN!
NO PROBLEM...
VADERS
SCORE 9800
HIGH SCORE 10000
DEFENCES 3
TO WIN 200
...OH.
SCORE 9800
10000
DEFENCES 2
TO WIN
THIS IS A TOUGH MACHINE, COL.
DAMN!
COME ON, STEVE! WHAT'S UP?
INVADERS
OH NO. OH NO...
I THINK I'VE GOT IT NOW, COL. JUST GOT TO...
WHOOPS.
DEFENCES 0
GAME OVER
PLANET EARTH
DESTROYED


THAT'S IT, THEN...
CHEER UP, LOVE. ON THE HOUSE.
ER... SORRY, PAL...
WHAT THE HELL...
AAAHHHH!
YOU LOST. YOU LOST THE GAME!
I...I...
YOU LOST THE GAME!
INVADERS
END OF GAME
THE END

BRAINY'S BRAINBOX

HI ! I'M BRAINY and I really rate computers. I'm in *Load Runner* every issue so write to me at 196-200 Balls Pond Road, London N1 4AQ and I'll do my best to answer any questions you have.

Remember, Brainy's the name and, by the way, I will pay £1 to anyone whose name is mentioned. Write away!

Trading in your ZX-81

I HAVE an old ZX-81 and want to trade it in and buy a Spectrum. Is it possible and if so, where?

Hywel Davis, Wantage.

I AM AFRAID I cannot help you. That is only possible, and even then rarely, for big computers. The only thing I can think of is if a local computer shop is making a special offer. On the other hand, you could try selling it second-hand. I think that trading-in is unlikely.

* * *

First-time buyer

I INTEND to buy a computer for the first time and I do not know whether to buy a cheap, temporary computer, to see if I like them, or to buy a good computer I shall keep permanently. Could you help me?

Paul Knight, Woodstock.

IT DEPENDS on how you are to use the computer. If you want to program it, you could buy a Sinclair ZX-81 for £40, the cheapest computer available, but it has no sound, no colour nor high-resolution graphics. It will introduce you to Basic. If you want to play games, think about the Vic-20, Spectrum, Atari, BBC, Electron or Commodore 64. The Spectrum has the biggest software range available. If you want to do both, then all those mentioned, except ZX-81 and Atari, are suitable.

* * *

Protected by copyright

MY FRIEND has found a way to copy game tapes. Is this illegal?

Paul Nicholls, Newbury.

IT CERTAINLY is illegal. It is unfair to program-writers and if they stop writing because they are not making money, you would suffer, too. So I advise your friend to stop it or we will all suffer and *Load Runner* might stop, too, and that would never do.

* * *

Micros are hot stuff!

WHEN I have been playing on my computer for a long time it becomes very hot. My dad says that is dangerous and he makes me switch off at once. I do not like having to stop in the middle of my game. What shall I do?

Jane Cartwright (8), Bradford, Yorks.

IT DOES NOT matter; most computers become hot after they have been switched on for some hours; the amount of time varies with the computer. There is something wrong if the picture on the screen becomes at all distorted, especially if it is within an hour or so of being switched on. Always make sure that you turn off the machine as soon as you have finished using it.

* * *

Money back guaranteed?

A FEW WEEKS ago I went to a computer fair and bought a tape for my Spectrum. When I arrived home I found it would not load. I have tried many ways to load the tape but it will not. Now I want my money back but do not know what to do. Can you help me?

Kathy Docker, Hall Green, Birmingham.

IF YOUR TAPE is second-hand, I cannot help you. You could try, I suppose, writing to the publisher of the tape to see what happens, but unfortunately it does not seem very helpful because you do not know what the previous owner did. It is a risk you take when you buy second-hand software. If, however, your tape was new, you can write to the owner of the stall—addresses can be found in your show guide—and ask. Failing that, try the publisher which, if it is reputable, should have its address on the box of your tape. Otherwise, I am afraid you will have to put it down to experience.

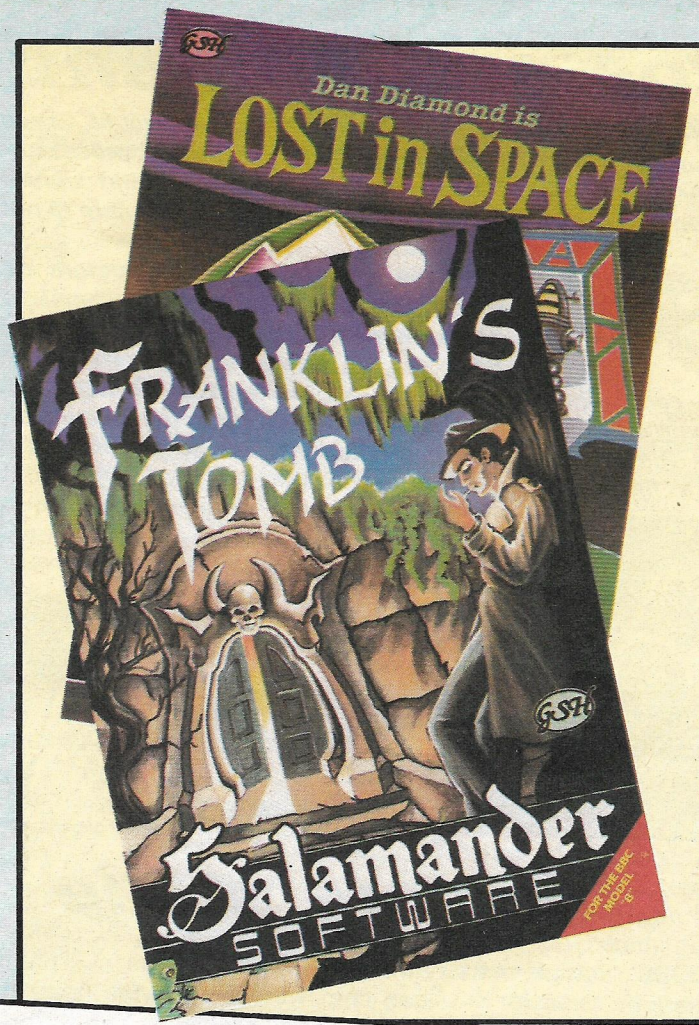
* * *

Which tape recorder?

WE HAVE recently bought a BBC micro. I have become bored of making up programs, and I want to be able to use cassettes. Should I order a BBC tape recorder or is it satisfactory to use a normal one?

Stuart Bellamy (11) Stratford-upon-Avon, Warwickshire.

SO FAR as I know, the official BBC cassette recorder is no better than any other in the shops and it is not cheap. If you are in a hurry, buy a "normal" one. Take the cassette lead and manual to a shop such as Currys. If you order a BBC recorder, it may take a few weeks to arrive.



Private eye Dan Diamond

IN THIS TEXT adventure for the BBC Model B you play the part of Dan Diamond, a detective with a terrible, pseudo-American accent. A description of your location and what you are carrying appears on screen at all times, while illustrations of various locations appear in an accompanying booklet.

Problems in early locations can be solved quickly—try shouting when you reach a dead end—moving you further into the crypt where, as the booklet warns, there are both red herrings and blue kippers to be found in *Franklin's Tomb*.

The game is enjoyable, although minor flaws are annoying at times. The program does not respond to some words, leaving the player waiting for an answer. The spelling also is not perfect which is frustrating when a word has been typed-in correctly.

Fun, 6; addictive, 7; graphics, 0.

LOST IN SPACE forms the second part of the Salamander Software Dan Diamond trilogy for the Dragon 32. It is a simple text-only adventure.

The story is that you are drifting through space aboard a derelict spaceship and must find your way through a maze of rooms to the bridge to regain control of the vessel. Be careful not to press too many buttons on your spaceship if you do not want the security robots to rush in and over-power you.

Aside from those difficulties, the computer responses are varied and lively enough to make you want to persevere with the game. If desperate, you can even send to Salamander Software for a help sheet to save you from your predicament.

***Lost in Space* and *Franklin's Tomb* are produced by Salamander Software, 17 Norfolk Road, Brighton, East Sussex BN1 3AA, and cost £9.95 each.**

Fun, 6; addictive, 7; graphics, 0.

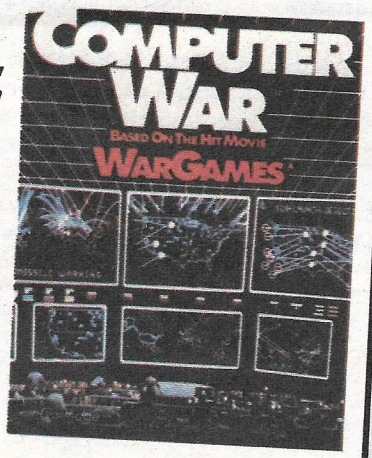
Crack the code

COMPUTER WAR is based on the hit movie* WarGames *and if you like the movie the game is a must. Someone has activated a nuclear war simulator program accidentally in the American defense computer NORAD and the player's task is to prevent the destruction of two continents.

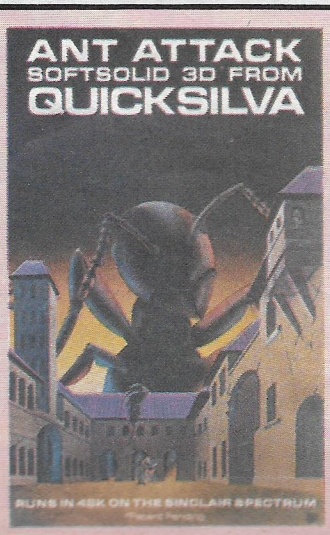
A map of North America is shown alongside a display from the NORAD computer. White blips, which represent missiles, are shown on the map and the player has to destroy all of them before they reach their missile base targets. If the player is successful he has a chance to crack the computer code and shut down one of the bases; when all the bases have been shut down and the NORAD computer is saved, a new wave begins.

The game makes good use of the Atari graphics capabilities and produces some excellent special effects. Computer War is available in cartridge form from Thorn-EMI video and is a little expensive at £31.95.

Fun 7; Addictive 7; Graphics 9.



Killer ants



ANT ATTACK is possibly the ultimate sophistication of the Pacman-type game. This time the maze is three-dimensional and the ghosts are replaced by killer giant ants which can be destroyed, not by eating power pills, but by aiming and throwing hand grenades.

The screen display is best described as an animated film. You see your heroine—or hero if you so choose—climb into the walled city, search the maze, avoid or kill the giant ants and emerge once more. All that can be seen from any of four angles.

The first rescue is easy but the following ones are much more difficult. Thirteen keys are used and to defeat the ants you must be able to use each of them quickly and accurately. If a game which uses four keys makes you feel you are all fingers and thumbs,* Ant Attack *is not the game for you. For the experienced player, though, it is a fresh challenge.

Ant Attack *is available from Quicksilva Ltd, Palmerston Park House, 13 Palmerston Road, Southampton SO1 1LL for £6.95.*

Fun, 8; addictive, 8; graphics, 10.

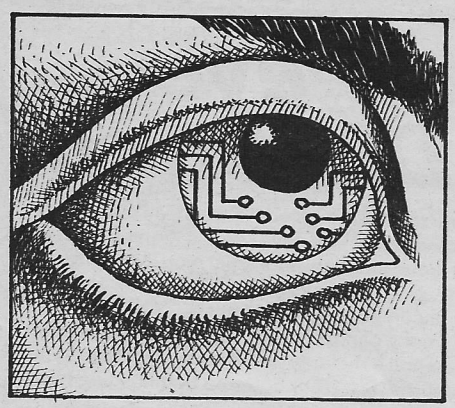
Space Quest

IN SPACE QUEST, for the 16K Oric, the aliens are, as usual, doing what they like best — bombing almost defenceless Earth cities. The player's task is to intercept and destroy the falling bombs. There is, however, a catch — the player's cursor must be the same colour as the bomb which is to be detonated. Changing colour can be done by using keys 1, 2, 3 and 4. Displayed at the bottom of the screen is a guide to the relative positions of the bombs and the player.

There are four levels of difficulty but the experienced player will find it all too easy to accumulate a very high score. Perhaps the defence of Earth is becoming all too easy nowadays.

Space Quest is available from Express Software and costs £5.95.

Fun, 6; addictive, 5; graphics, 5.



Biological computers

COMPUTER SCIENTISTS agree that the next revolution in computing will be artificial intelligence and expert systems—computers with software which follows the patterns of human behaviour so that very complicated programs can work.

Did you know, however, that scientists are talking about what kind of computer will follow expert systems? Some think they will be biological computers, as theoretically it is possible to replace silicon in chips with molecules and proteins.

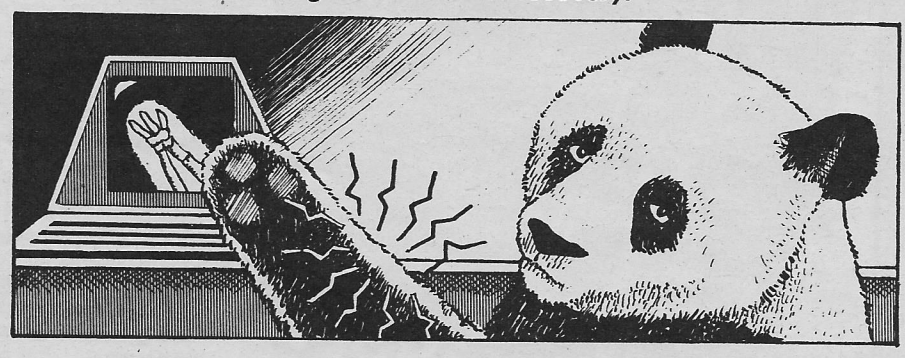
Those scientists believe that molecules and proteins will offer many more ways of using data, perhaps even to the point when those biochips can copy the way the human brain works. Many other scientists think it will never happen and, in any case, biochips are unlikely to become reality until the next century.

Micros on the mend

IF YOU EVER become ill it is possible your doctor would use a microprocessor to help you recover. For instance, a microprocessor-controlled transmitter placed near a broken bone can send signals giving information on how the bone is healing and whether it is safe to put strain on it.

Microprocessors can also control the voice-boxes which doctors implant when somebody has damaged his voice, as well as the pacemakers which people with faltering hearts use to control the flow of blood around the body.

Animals, too, can be helped by computers, as the London Zoo giant panda Ching-Ching discovered when she needed an operation. Obviously pandas are far too big to tuck up in bed so her vet implanted a microprocessor in her leg to monitor her recovery.



How chips are made

WHAT DOES "complementary metal oxide silicon" mean? That is the scientific term for a silicon chip which forms the heart of today's microcomputers.

To manufacture a chip, a crystal of silicon has minute wafers sliced from it which are then inlaid with metal to form electrical circuits. The machine which slices the silicon has to work within microns—thousandths of a centimetre—otherwise electrical currents are unable to pass through the silicon semiconductor.

The highly-technical cutting machine is called a chipper and from the birth of complementary metal oxide silicon in 1969, computer buffs have borrowed the name of the machine to describe the semiconductor.

The Computer Story

A HISTORY OF COMPUTERS

PART THIRTEEN

Right: Claude Shannon and, below, a diagram from his thesis, which was theoretical basis of all the operations that were designed into electronic digital computers.

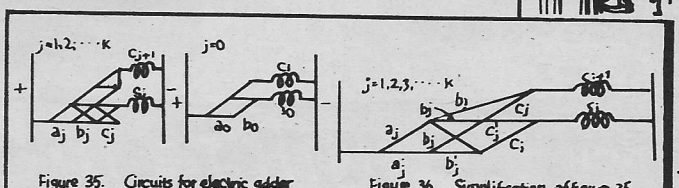


Figure 35. Circuits for electric adder

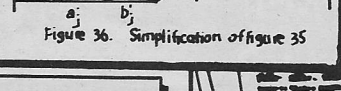


Figure 36. Simplification of figure 35

IN PRINTOUT No.12 WE LOOKED BRIEFLY AT THE PIONEERING WORK OF PHILOSOPHERS AND LOGICIANS THAT LAID THE FOUNDATIONS FOR SOFTWARE DESIGN. BUT THE DISTINCTION BETWEEN HARDWARE AND SOFTWARE IS A BIT ARTIFICIAL – AFTER ALL, ONE CANNOT WORK WITHOUT THE OTHER – AND THEIR DEPENDENCE ON EACH OTHER IS ILLUSTRATED BY THE FACT THAT UNTIL VERY, VERY RECENTLY, IT WAS IMPOSSIBLE TO TAKE THE SOFTWARE FROM ONE MACHINE, AND RUN IT ON ANOTHER, SLIGHTLY DIFFERENT COMPUTER.

WE'RE NOW AT THE POINT IN OUR STORY WHERE THE DESIGN OF LOGIC CIRCUITS BECAME INTEGRATED WITH THEORIES OF INFORMATION PROCESSING. THE RESULT WAS THE FIRST, PRIMITIVE ELECTRONIC CALCULATORS.

FOLLOWING OUR DIVERSION INTO LOGIC, WE RESUME OUR STORY WHERE WE LEFT OFF IN PRINTOUT No. 11 – BACK AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT), WHERE VANNEVAR BUSH'S DIFFERENTIAL ANALYSER WAS IN NEED OF CONSTANT ATTENTION TO THE RELAY CIRCUITS....

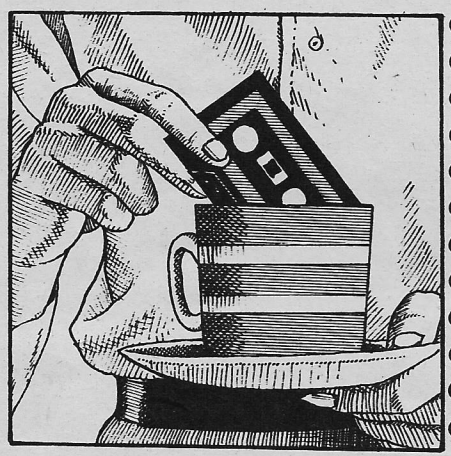
LOGICAL DEVELOPMENTS

Waterproof cassettes?

ALL COMPUTER users must be aware how easily water can ruin a computer system. Yet one big computer installation refused to give in when the River Avon overflowed, causing the computer complex to be flooded with foul sewage.

Although the ICL computer was ruined, its magnetic tapes were taken away despite being covered with slime. A pulley system was made quickly which pulled the tapes through jets of water to get rid of the slime and, after they had been cleaned thoroughly, warm air was used to dry the tapes.

The company claims that it was able to save the data on the tapes. Though home computers are unlikely to face anything more dangerous than a spilt cup of coffee, it is unlikely that cassettes could survive such treatment.



Buzzwords are the jargon of the computer world and can be very confusing. Below, *Load Runner* continues its glossary of computing terms. Get buzzing.

Motherboard. A large circuit board into which you can slot smaller boards, sometimes known as daughterboards or cards, to enlarge the size and increase the capabilities of your system.

Multi-access system. A system which allows computer users to run programs at the same time. Usually it consists of a main computer linked to several terminals. The action of several people using a central computer at the same time, via their individual terminals, is known as time-sharing.

Number-crunching. A term used when a computer can complete difficult mathematical tasks very quickly.

Network. A system consisting of several linked computers, linked often via telephone lines. Computer users can communicate with each other or share their peripherals in this manner. A good example of a home computer network is the Micronet system, which enables the computer user to contact another user, often to send programs, via telephone lines.

Off-line. A peripheral such as a printer or VDU is off-line if it is not attached to a computer or if it is connected but not functioning. Once the electrical current has been switched-off and there is no power running through the computer peripherals the term off-line is applicable.

On-line. The opposite of off-line. A peripheral which is connected to a computer and is working is on-line.

Output. The results the computer gives from any information you have input. One example of type of data output by a computer is a program printout.

Paddle. An alternative to a joystick which, like the latter, is controlled manually and can move the cursor about the VDU screen. A prime use for a paddle, which despite the name has the appearance of a round knob, is in bat-and-ball-type games.

PEEK. An instruction which allows the user to look at the contents of a specific memory location. The PEEK instruction is found in the Basic language.

Peripheral. Any equipment which can be attached to a computer is a peripheral. Also known as add-ons, some examples of peripherals are printers, tape recorders and television sets.

CLAUDE SHANNON WAS A YOUNG STUDENT AT MIT, EARNING A FEW EXTRA DOLLARS OPERATING THE ANALYSER IN THE EVENINGS.

UNHAPPY WITH THE RELAY CIRCUIT DESIGN, BUSH SUGGESTED TO SHANNON THAT THEY COULD BE IMPROVED USING FORMAL LOGIC, AND THAT IT WOULD MAKE A GOOD THESIS SUBJECT.

SHANNON RECONSIDERED PREVIOUS WORK ON LOGICAL MACHINES, INCLUDING THE DESIGNS OF MARQUAND AND PIERCE, AND SHOWED PRECISELY HOW ONE MIGHT CONSTRUCT ELECTRICAL CIRCUITS TO ADD, SUBTRACT, MULTIPLY, ETC. HIS THESIS SUGGESTED - ALMOST IN PASSING - THAT THE CIRCUITS COULD BE SIMPLIFIED BY USING THE BINARY COUNTING SYSTEM.

AFTER GRADUATING IN 1941, SHANNON WENT TO WORK FOR BELL TELEPHONE LABORATORIES, AND STARTED WHAT IS NOW CALLED "INFORMATION THEORY."

MODERN COMPUTERS COULD NOT HAVE DEVELOPED WITHOUT IT - BECAUSE IT SHOWS HOW INFORMATION CAN BE REPRESENTED AS ZEROS AND ONES, AND THEN ANALYSED BY STRICT MATHEMATICAL METHODS.

MEANWHILE, ALSO AT BELL LABS, ANOTHER YOUNG MATHEMATICIAN, GEORGE STIBITZ, WAS WORKING ON PROBLEMS TO DO WITH TELEPHONE RELAYS. HE HAD NOT READ SHANNON'S PAPER, BUT AT HOME BEGAN ASSEMBLING EXPERIMENTAL CIRCUITS THAT WERE VERY SIMILAR. HE NOTICED THAT ONE OF THEM WAS EQUIVALENT TO ONE DIGIT OF A BINARY ADDER.

STRAIGHT AWAY, HE DREW UP A CIRCUIT FOR THE "CARRY" DIGIT, AND CONNECTED THEM UP TO TWO SMALL LIGHT BULBS FOR "OUTPUT". ON THE KITCHEN TABLE WAS THE WORLD'S FIRST ELEMENTARY UNIT OF AN ELECTRONIC CALCULATOR. WHAT HE DID NEXT..... YOU CAN FIND OUT IN THE NEXT PRINTOUT!

Left: George Stibitz joined Bell Labs in 1930. He named his adder after the kitchen table he built it on - The Model "K."

Written and drawn by Chris Smithers

A LOAD RUNNER cutaway of the

TANDY COLOR COMPUTER

A pull-out poster guide to the anatomy of the micro

THE TANDY Color computer is an enhanced version of the TRS-80. Although it has certain peculiarities, the structure of the computer hardware bears close resemblance to most other computers on the market.

The **power supply** is led in through a connector at the side of the keyboard casing. The computer may be in operation for many hours at a time and the casing and components would become hot if a device was not included to remove heat generated by the power supply. The **heat sink** at the left-hand side of the casing removes any excessive heat.

The **re-set switch** is used to interrupt the power if the machine crashes and nothing else can be done with it. The switch enables the user to regain control of the computer.

The **power transistor** ensures an uninterrupted flow of current to the machine. That power flow needs to be exact and a strict control of power must be maintained to all the main components inside the machine. Particularly vulnerable are the **RAM memory chips** which hold the programs typed-in by the user. To maintain a steady flow of the correct voltage, the **capacitors** regulate any rise or fall in power. If that did not happen, one of two events would occur. If insufficient power was applied to the RAM chips, programs and data would be lost, or if there was too much power the chips would overheat and be damaged irreparably. The machine can cope with a number of RAM chips and the memory size of the machine can be from 16K to 32K, depending on the user's needs.

Information is accepted from the keyboard by the central processor unit — **CPU** — which then stores it in the random access memory — **RAM** — chips. Those chips contain the information until the user either re-sets the machine with the power on, or switches off the power. That is because information, in the form of programs or data, is stored as electronic pulses.

The CPU co-ordinates the process of storing information in the RAM and is able to find that information when it is needed. The chip is the heart of the computer and will execute a Basic program line for line, when the user gives it a command to do so.

The **crystal** is a timing device which ensures that all the operations performed by the computer follow the sequence in which the CPU requires them. It is similar in operation to the crystal in digital watches.

The read only memory — **ROM** — contains a program which allows the user to write programs in the Basic language. That type of memory keeps a permanent record of that program, even when the power is switched off at the main supply.

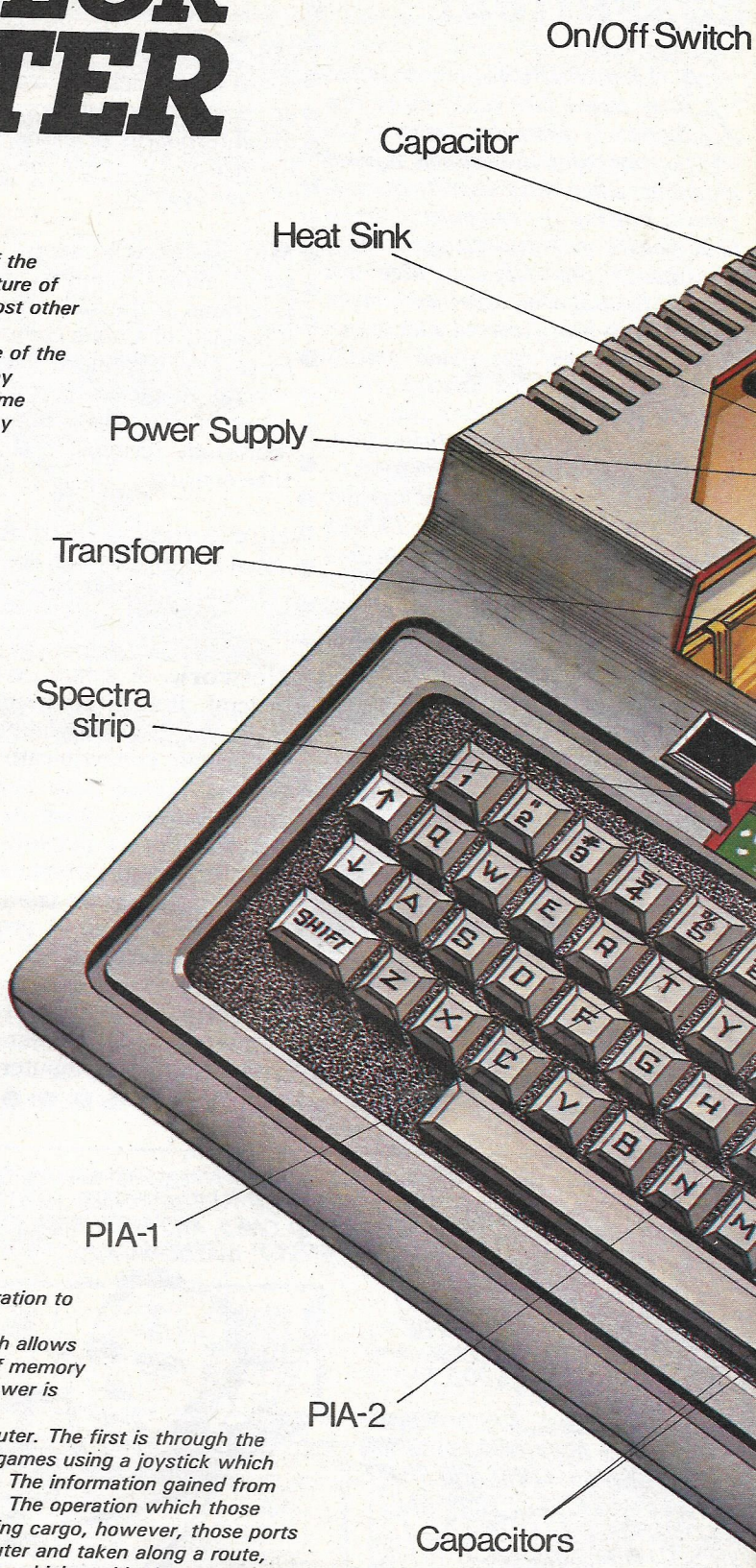
There are two other ways to put information into the computer. The first is through the two **joystick ports**. Those connections allow the user to play games using a joystick which behaves in the same way as the control column in an aircraft. The information gained from the joystick is channeled into the computer through the ports. The operation which those ports perform is similar to that of a sea port. Instead of handling cargo, however, those ports handle information. The information is accepted by the computer and taken along a route, called a databus, to the peripheral interface adaptors — **PIA** — which enable the computer to handle the information. The CPU then takes action depending on which direction the user moves the joystick.

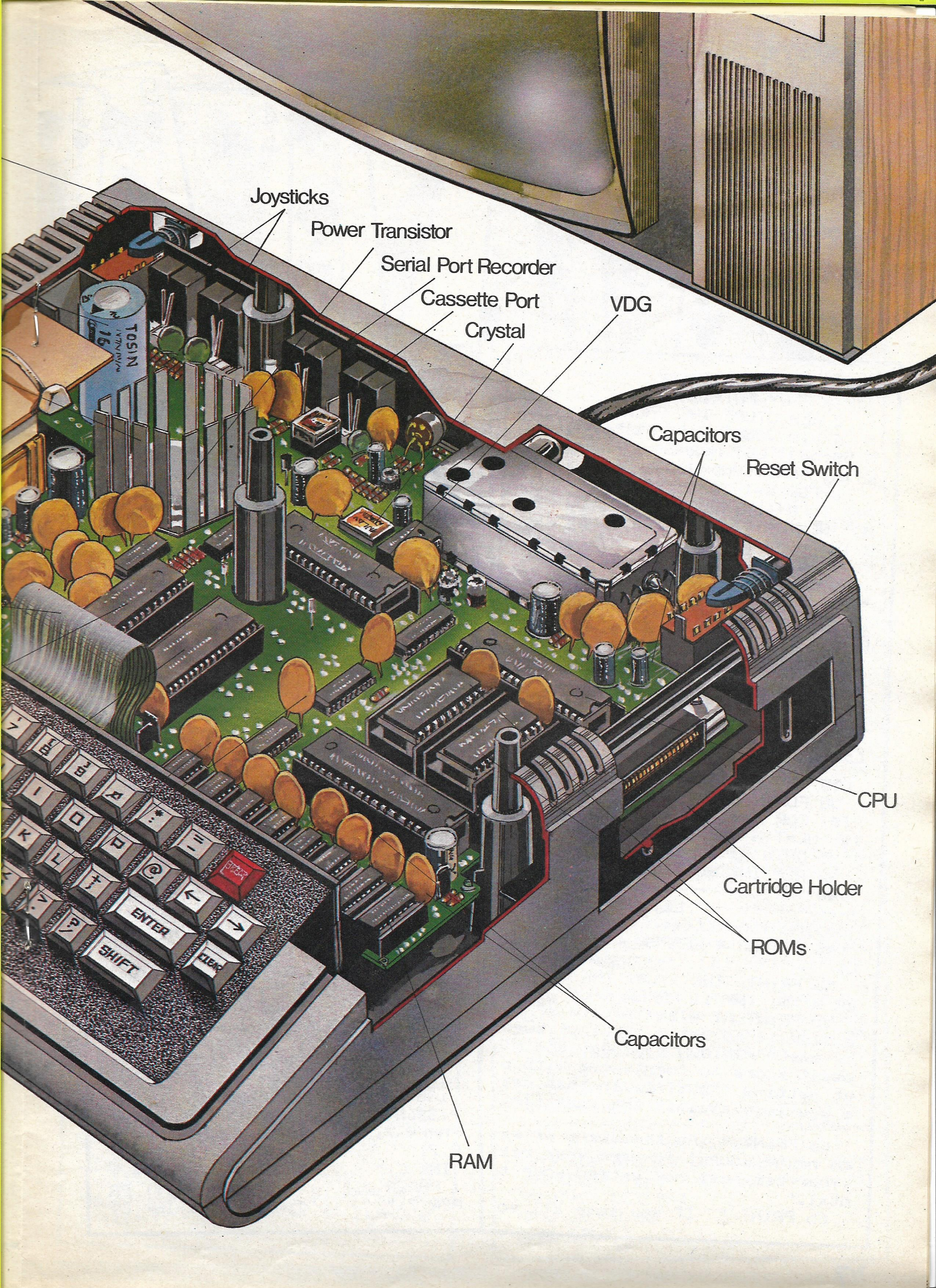
The other input device is a tape recorder, which stores and retrieves information from the computer on to cassette tape. That is not provided with the machine and any cassette machine can be used.

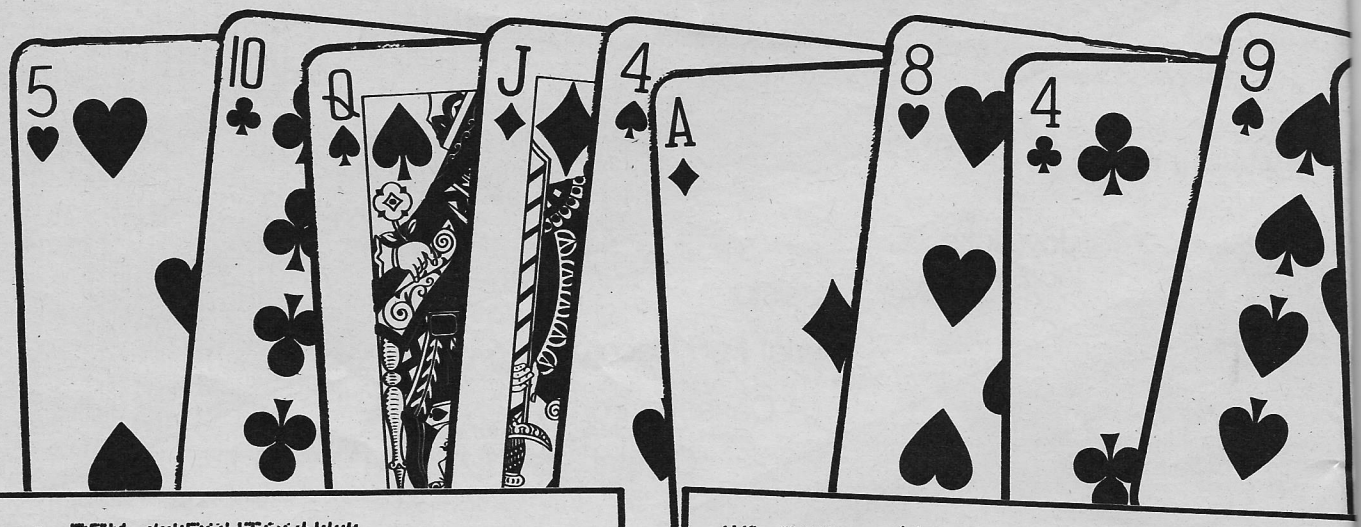
The information is transmitted from the recorder through a DIN lead to a **cassette port** at the back of the machine. It is then scanned by the CPU and stored in RAM.

The **cartridge holder** allows ROMs which have programs in them to slot into the machine. The user then has instant access to those programs.

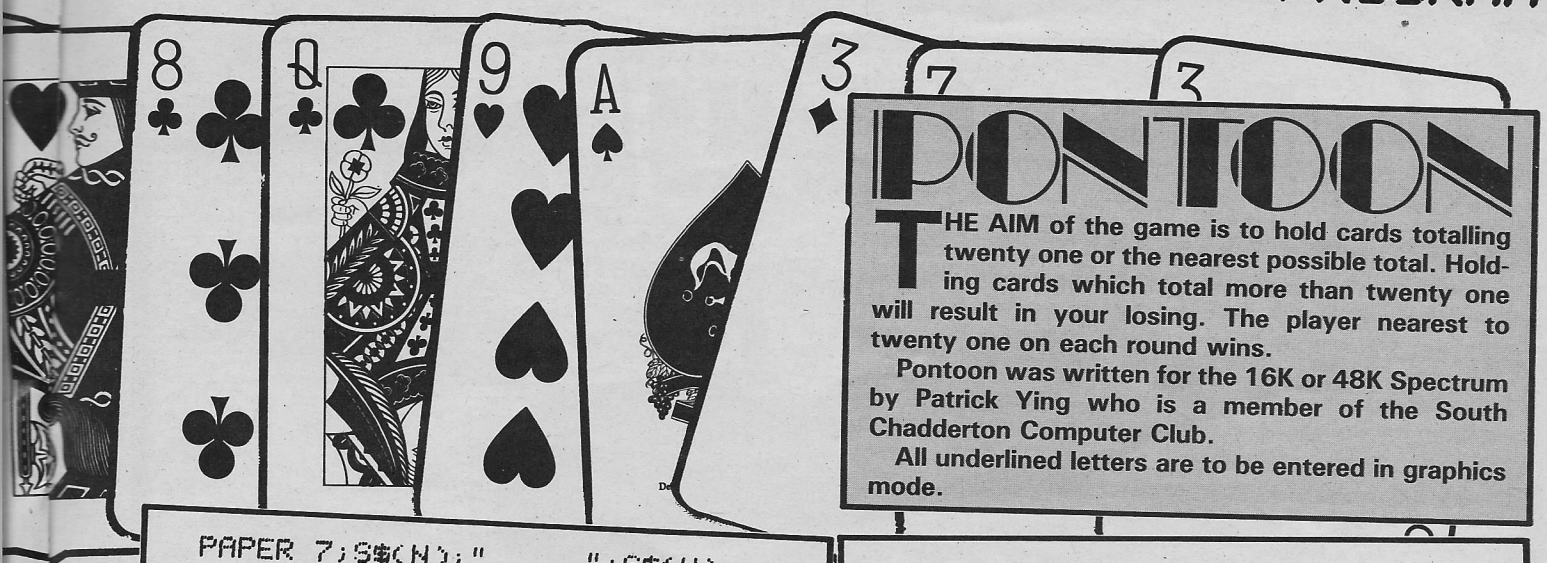
The video display generator — **VDG** — or colour modulator creates the colours seen on the television screen through the aerial socket of the machine. It affects the raster scan of the television set. The scan is a beam of light which goes over each cell and line of the television screen to create the picture. The modulator in the computer will help the television set to produce an image of the information selected for display by the user. The display transmitted through the aerial lead from the computer is a pictorial representation of the task in which the computer is engaged at a particular time. It could be a list of program instructions of the graphics in a game. It is the final result of the computer's processing so far as the user is concerned.




Joysticks
Power Transistor
Serial Port Recorder
Cassette Port
Crystal
VDG
Capacitors
Reset Switch
CPU
Cartridge Holder
ROMs
Capacitors
RAM



```
  1 REM **PONTOON**
       BY PATRICK YING
  2 REM STORE THE PACK
  4 DIM V(56): DIM P$(56,2): DI
M S$(56): LET MARKER=1: RANDOMIZ
E INT (RND*(RND*900))
  5 FOR N=1 TO 56 STEP 14: FOR
M=N TO N+13: READ V(M): READ P$(
M): NEXT M: IF N<42 THEN  RESTOR
E 10: NEXT N
  7 NEXT N
 10 DATA 1,"1",2,"2",3,"3",4,"4
",5,"5",6,"6",7,"7",8,"8",9,"9",
10,"T",10,"J",10,"Q",10,"K",11,"
A"
 12 REM DEFINE GRAPHICS
 15 FOR N=0 TO 30: READ S: POKE
 USR "A"+N,S: NEXT N
 20 DATA 34,119,127,127,62,28,8
,0,8,28,62,127,62,28,8,0,8,28,42
,127,73,8,8,28,8,62,127,62,8,28,
0
 25 REM STORE SUITS
 30 FOR N=1 TO 56 STEP 14: READ
 T$: FOR M=N TO N+13: LET S$(M)=
T$: NEXT M: NEXT N
 35 DATA "a","b","c","d"
 39 REM INSTRUCTIONS
 40 LET L$="----------------
--------------": LET X$=">>>>>>>>
>>>>>PONTOON<<<<<<<<<<<<<"
 45 BORDER 4: PAPER 4: INK 0: C
LS
 50 PRINT  INK 1;L$; INK 6; PAP
ER 0;X$; INK 1; PAPER 4;L$
 55 PRINT AT 4,2;"The aim of th
e game is to get a total of twen
ty one(""PONTOON"")or get the cl
osest score to twenty one with o
ut getting ""BUST"". In that cas
e you lose against the computer.
"
 60 PRINT "  At the start of ea
ch round youput forward your bet
.Your bet must not exceed your t
otal."
 65 PRINT "  If you lose all yo
ur money then you have lost the
game.However if the computer lose
s all it's money before you do t
hen you would have won the game,
and the computer will get some m
ore money tohave another game(Ac
e=11)."
 70 PRINT AT 21,3; INK 0;">>>";
 FLASH 1;"PRESS A KEY TO PLAY";
FLASH 0;"<<<"
 75 IF INKEY$="" THEN  GO TO 75
 77 REM INITIALIZE VARIABLES
 80 LET COMPTOT=99999: LET M=1:
 LET YOURTOT=5000: LET X=0: LET
Y=0: CLS : PRINT AT 10,7; INK 0;
">>>"; INK 2; FLASH 1;"SHUFFLING
"; FLASH 0; INK 0;"<<<"
 85 REM SHUFFLE CARDS
 87 CLS : PRINT AT 10,7; INK 0;
">>>"; INK 2; FLASH 1;"SHUFFLING
"; FLASH 0; INK 0;"<<<"
 90 FOR M=1 TO 30: LET N=INT (R
ND*55)+1: LET RN=INT (RND*55)+1
 95 LET A$=P$(N): LET P$(N)=P$(
RN): LET P$(RN)=A$
 100 LET A$=S$(N): LET S$(N)=S$(
RN): LET S$(RN)=A$
 105 LET A=V(N): LET V(N)=V(RN):
 LET V(RN)=A
 110 BEEP .1,INT (RND*40)-12: NE
XT M
 112 GO TO 150
 115 REM DEAL CARDS ROUTINE
 117 IF MARKER=1 THEN  CLS : LET
 VL=0
 120 FOR N=M TO 56
 125 IF S$(N)="a" OR S$(N)="b" T
HEN  LET C=2
 130 IF S$(N)="c" OR S$(N)="d" T
HEN  LET C=0
 135 PRINT AT X,Y; INK C; PAPER
7;S$(N);"      ";S$(N);AT X+1,Y;
PAPER 7;"        ";AT X+2,Y; PAPE
R 7;"        ";AT X+3,Y; PAPER 7;
 INK C;"   ";P$(N);"  ";AT X+4,Y
; PAPER 7;"        ";AT X+5,Y; PA
PER 7;"        ";AT X+6,Y; INK C;
```



PONTOON

THE AIM of the game is to hold cards totalling twenty one or the nearest possible total. Holding cards which total more than twenty one will result in your losing. The player nearest to twenty one on each round wins.

Pontoon was written for the 16K or 48K Spectrum by Patrick Ying who is a member of the South Chadderton Computer Club.

All underlined letters are to be entered in graphics mode.

```
 PAPER 7;S$(N);"      ";S$(N)
 138 LET VL=VL+V(N)
 140 IF MARKER<2 THEN  LET Y=Y+9
: LET MARKER=MARKER+1: NEXT N
 143 IF Y>=18 THEN  LET Y=-9: LE
T X=X+8
 145 RETURN
 148 LET Y=Y+9: NEXT N
 150 REM BET
 155 CLS : PRINT AT 6,4;"compute
rs total=";COMPTOT;AT 8,4;"Your
total=";YOURTOT;AT 10,4;"To win
the game=";COMPTOT-YOURTOT;AT 12
,4; FLASH 1;"Please lay your bet
?"; FLASH 0
 160 INPUT "Bet=";bet: IF bet>YO
URTOT THEN  GO TO 155
 165 GO SUB 115
 170 IF VL>21 THEN  GO TO 200
 175 IF VL=21 THEN  PRINT AT 20,
8;">>>"; FLASH 1; INK 6; PAPER 2
;"PONTOON"; FLASH 0; INK 0; PAPE
R 4;"<<<": FOR M=1 TO 200: NEXT
M: LET YTOT=VL: GO TO 240
 180 REM option
 185 IF INKEY$="S" OR INKEY$="s"
THEN  LET YTOT=VL: GO TO 240
 190 IF INKEY$="T" OR INKEY$="t"
THEN  GO SUB 148
 195 GO TO 170
 200 REM BUST
 210 PRINT AT 20,9; INK 0;">>>";
 FLASH 1; INK 6; PAPER 2;"BUST";
 FLASH 0; INK 0; PAPER 4;"<<<"
 213 FOR N=1 TO 2: FOR M=30 TO 1
 STEP -1: BEEP .1,M: NEXT M: NEX
T M
 215 LET YTOT=0: LET YOURTOT=YOU
RTOT-BET: LET COMPTOT=COMPTOT+BE
T: LET VL=0: LET X=0
 220 LET Y=0: LET M=1: LET MARKE
R=1: IF YOURTOT<>0 THEN  GO TO 8
5
 230 CLS : PRINT AT 10,10; INK 0
;">>>"; FLASH 1; INK 6; PAPER 2;
"SORRY"; INK 0; PAPER 4; FLASH 0
;"<<<"
```

```
 235 FOR N=1 TO 300: NEXT N: RUN

 240 REM COMPUTERS TURN
 245 LET MARKER=1: LET M=1: LET
X=0: LET Y=0: CLS : GO SUB 115
 248 IF VL>15 THEN  GO TO 250
 249 GO SUB 148: GO TO 248
 250 IF VL<=21 AND VL>YTOT THEN
 GO TO 270
 255 IF VL=YTOT THEN  GO TO 320
 260 IF VL<YTOT OR VL>21 THEN  G
O TO 285
 270 REM COMPUTERS WON
 272 PRINT AT 19,8; INK 0;">>>";
 INK 6; PAPER 2; FLASH 1;"YOU'VE
 LOST"; FLASH 0; PAPER 4; INK 0;
"<<<": FOR N=1 TO 300: NEXT N
 275 LET COMPTOT=COMPTOT+BET: LE
T YOURTOT=YOURTOT-BET: IF YOURTO
T=0 THEN  GO TO 230
 280 LET M=1: LET YTOT=0: LET X=
0: LET Y=0: LET MARKER=1: GO TO
85
 285 REM COMPUTERS LOST
 290 PRINT AT 20,8; INK 0;">>>";
 FLASH 1; INK 6; PAPER 2;"YOU'VE
 WON"; FLASH 0; INK 0; PAPER 4;"
<<<"
 292 FOR N=1 TO 300: NEXT N
 295 LET YTOT=0: LET YOURTOT=YOU
RTOT+BET: LET COMPTOT=COMPTOT-BE
T: LET MARKER=1: LET X=0: LET Y=
0
 300 IF COMPTOT=0 THEN  FOR M=1
TO 3: FOR N=20 TO 1 STEP -1: BEE
P .1,N: NEXT N: NEXT M: LET COMP
TOT=2*YOURTOT: LET M=1
 310 GO TO 85
 320 REM DRAW
 330 PRINT AT 20,9; INK 0;">>>";
 INK 6; PAPER 2; FLASH 1;"DRAW";
 INK 0; FLASH 0; PAPER 4;"<<<"
 335 FOR N=1 TO 300: NEXT N: LET
 MARKER=1: LET X=0: LET Y=0: LET
 YTOT=0: LET M=1
 340 GO TO 85
 345 STOP
```

Sharp MZ-700

Sharp U.K. Ltd
Thorn Road
Newton Heath
Manchester M10 9BE

Specifications

Price		£249.95
Numbers sold		—
How sold		Assembled
Processor		Z-80A
Standard RAM		64K
Expansion RAM		—
Basic + operating system		8K ROM
Display	Colour	25 lines × 40 characters
Tape recorder		Standard
Backing storage		—

Software

Solo Software, 51 Broad Street, Worcester WR1 3LR.
Sharpsoft, 2nd Floor, Crisallen House, 86-90 Paul Street, London EC2.
Kuma Software, 11 York Road, Maidenhead, Berkshire.
Knight TV & Computers, 108 Rosemount Place, Aberdeen AB2 4YW.

Comments

Released in September, the Sharp MZ-700 can be used for business purposes as well as fulfilling its role of home computer. The MZ-700 is in an off-white casing, is the size of a portable typewriter, and has 69 keys which include four cursor keys, five function keys and two editing keys.

The Basic language is loaded from cassettes, thus allowing the user to run other languages and make full use of the memory capacity.

It is possible for 16 colours, eight foreground and eight background, to appear on screen at the same time.

A printer/plotter has been produced specially for the MZ-700 and four ink pens—black, blue, green and red—are used to print on paper $4\frac{1}{2}$in. wide. There are two versions available, either with or without the integrated printer/plotter and cassette drive, and the machines retail at £420 for an integrated version or less than £250 for a standard machine with no accessories.

Software, including games and utilities, is available and each machine is sold with two tapes containing 10 games and also a Basic cassette.

Andy Royd-the DOMINATORS' Rogue star!

STRICKEN WITH **FINANCIAL TROUBLES**, AND THREATENED BY **CLOSURE**, THE DOMS' TEAM OF COMPUTER-CONTROLLED **ROBOPLAYERS** ARE PLAYING AWAY IN A CUP MATCH WITH **THE RAMS**...

WELL, ANDY, THIS IS THE **BIG ONE** - IF WE CAN GET THROUGH TO THE NEXT ROUND, THE **GATE MONEY** WILL SOLVE ALL OUR PROBLEMS!

ANDY AND DAVY SOAK UP THE BIG MATCH ATMOSTPHERE.

I USED TO COME AND WATCH THE **RAMS** AS A KID - I NEVER THOUGHT I'D EVER BE **PLAY-ING** AGAINST THEM!

YOU'D BETTER GET CHANGED - I'LL GO AND SEE IF ISOBEL'S LOADED THAT PROGRAM YET.

IN A DARK CORNER OF THE DOMS' LOCKER ROOM, THE ONLY **HUMAN** PLAYING SPORT IN THE 1990's SECRETLY DONS HIS DISGUISE...

I MUST GET THIS ARM REPAIRED PRETTY SOON. IT'S STILL PLAYING ME UP.

...ALTHOUGH ONE OF HIS **BIO-MECHANICAL LIMBS** HAS BEEN DAMAGED IN A FIGHT!

UNAWARE OF ANDY'S PROBLEM, DAVY CHECKS ISOBEL'S PROGRESS...

HOW GOES IT, ISOBEL?

IT'S LOADED OK, DAVY. WE'RE ALL SET.

HI, **KEEFY**! TODAY WILL BE **DAVY** AND **GOLIATH** ALL OVER AGAIN!

YEAH, BUT IN **REVERSE**! YOU'RE GOIN' TO NEED MORE THAN A **SLINGSHOT**! WE'VE NOT BEEN BEATEN AT HOME **ALL SEASON**!

MEANWHILE, OUTSIDE THE GROUND...

MY MAN **BILES** SAYS THIS GAME HAS GOT TO BE **WRECKED** IF THE DOMS ARE **WINNING**, SO... **PLUG, HORSE** AND **DIGGER** - YOU TAKE THE NORTH STAND.

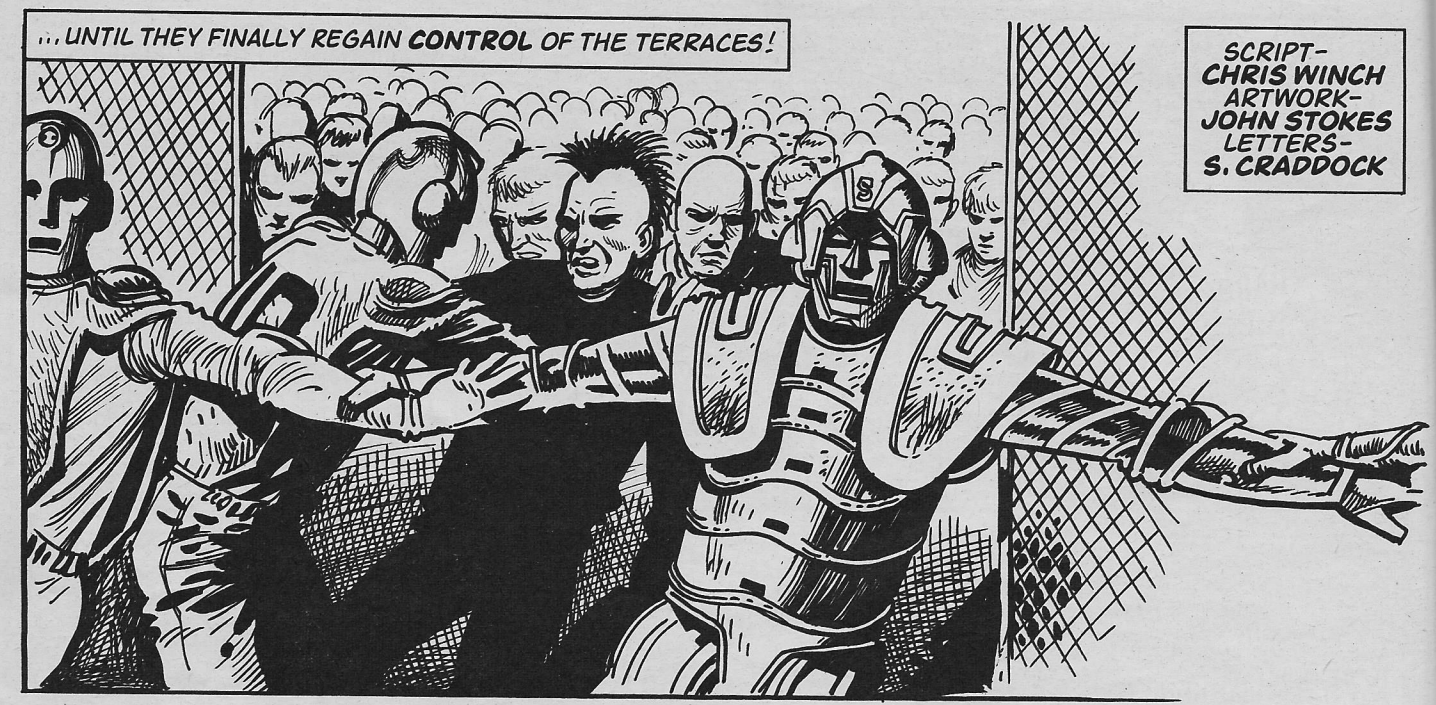
SPIDER, TWIG AND **DUV** - YOU COME WITH ME.

BUT HOW DO WE CRASH THE **SECURITY FENCES** AND GET ONTO THE PITCH?

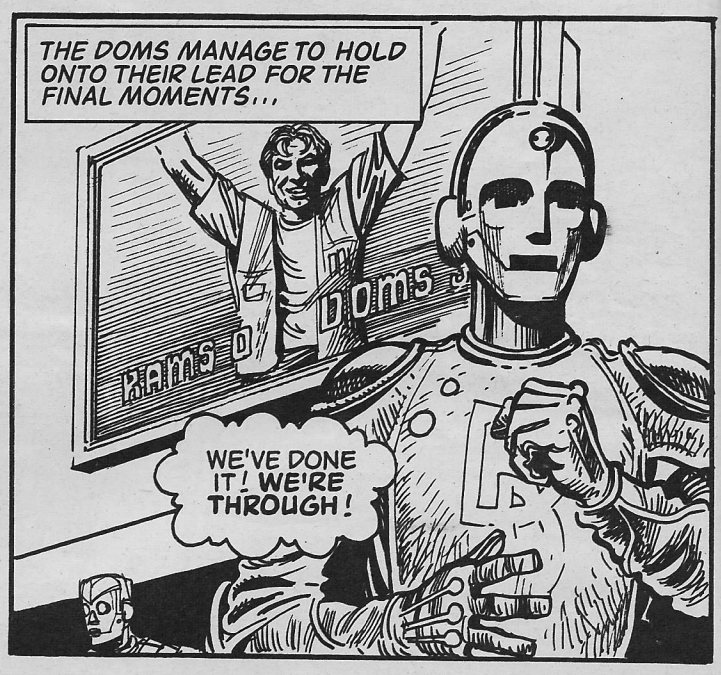
WITH THESE, MY LITTLE **HOOLIES**! THEY SHORT THE ELECTRIC CHARGE ON THE CAGES **AND** OPEN THE **SECURITY GATES**!


THERE'S THE GREENLIGHT - WE'RE ON-LINE!
THE GAME STARTS AND ANDY, THE DOMS' ROGUE STAR, BURSTS INTO THE RAMS' PENALTY AREA...
...TO PUT THEM ONE UP...
...AND SET THE SCENE FOR THE REST OF THE MATCH!
FIVE MINUTES TO GO - THREE GOALS UP! NOTHING CAN STOP US!
BUT SOMEONE HAS OTHER IDEAS!
OK, DUV - YOU KNOW WHAT TO DO - BUT JUST WAIT UNTIL I'M DOWN THE FRONT.
AS THE SECURITY ROBOTS RUSH TO QUELL DUV'S DIVERSION...
HORSE - LET 'EM LOOSE YOUR END!


CHARGE
ON - OFF
GATES
OPEN
THE CROWD, NORMALLY HELD BACK BY THE ELECTRIC FENCES, SPILLS ONTO THE PITCH IN A MINDLESS SEETHING MASS!
WHAT THE -?! WE HAVEN'T HAD CROWD TROUBLE HERE FOR YEARS!
ROLAND BILES, WHO SUPPLIED THE FORGED COMPUTER CARDS, IS OVERJOYED...
I'VE A FEELING MARSHALL IS GOING TO BE BUILDING ON THE DOMS' GROUND IN THE VERY NEAR FUTURE!
THERE'S A REAL UGLY GUY OVER THERE WHO SEEMS TO BE THE LEADER OF THIS MOB!
ROYD
SPEAK BACK
REQUEST
ANDY - WHAT'S GOING ON DOWN THERE?
IT'S HAVOC! THERE AREN'T ENOUGH SECURITY ROBOS TO CONTROL THEM!
BUT THERE ARE OTHER ROBOS...
IF I CAN LINK INTO THEIR PROGRAM WE CAN CONTROL THE ROBO PLAYERS AND THE SECURITY ROBOTS.
THAT'S IT! DAVY, SIT AT THE OTHER TERMINAL -WE'VE GOT WORK TO DO.
ISOBEL AND DAVY CONTROL THE ROBOPLAYERS AND START TURNING THE TIDE...



SCRIPT- CHRIS WINCH
ARTWORK- JOHN STOKES
LETTERS- S. CRADDOCK



NEXT PRINTOUT> BEYOND REASONABLE DOUBT!

SIMIAN'S WORLD

THERE IS FEAR IN THE CITY TONIGHT. AND LOSS. THEY MOURN THE DEATH OF PROGRAMMER TRUMBULL.

IT WAS SIMIAN'S INTERROGATION THAT KILLED HIM.

I HEARD HE WENT MAD TOWARDS THE END.

FROM EVERY TERMINAL IN THE CITY...

THE SAME VOICE...

THE SAME FACE...

THE SAME DEMAND...

SIMIAN!

WHO ARE THEY TALKING ABOUT? WHO STRIKES FEAR IN THE HEART OF THE CITY? AHH... OF COURSE... SIMIAN!

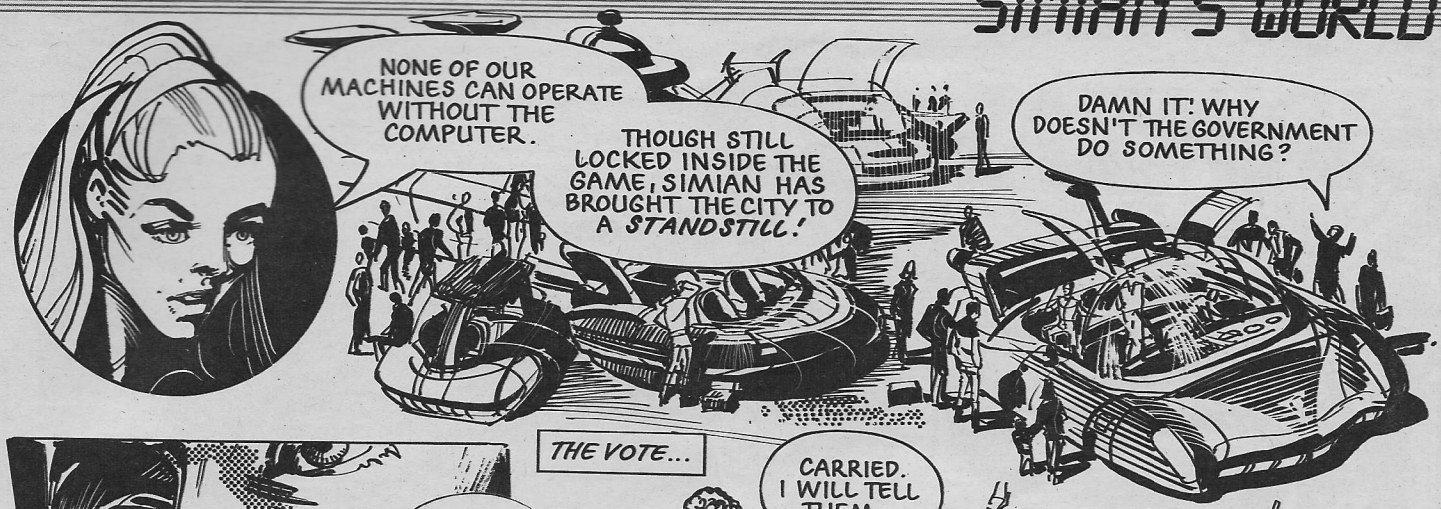
THE BOY! GIVE ME THE BOY!

MAD? WELL WE ALL KNOW ABOUT MADNESS NOW, DON'T WE?

YOU MEAN, LISTENING TO HIM EVERY DAY..?

SCRIPT
ROB BEATTIE
ARTWORK
JOHN CANNING
LETTERS
STEVE POTTER


THE REVOLUTIONARY COUNCIL MEETS.
LET US REVIEW THE FACTS FOR THE LAST TIME.
YES, AND THEN WE MUST DECIDE.
THIS EQUATION WILL ENABLE MEN TO JUMP FROM OUR OVERCROWDED WORLD TO ANOTHER GALAXY.
PROGRAMMER TRUMBULL DISCOVERED THE SECRET TO INTERSTELLAR TRAVEL...
"SIMIAN, THE DICTATOR, TRIED TO EXTRACT THE INFORMATION..."
WHERE IS THE EQUATION?
AAAGHH!
"BUT HE HAD HIDDEN IT IN AN ADVENTURE WORLD PROGRAMMED INTO THE COMPUTER."
IT'S SAFE. YOU CAN'T GET IT.
"TRUMBULL'S CHILDREN, MARC AND JAN, WERE DIGITISED INTO THE GAME WORLD...
WE MUST FIND THE LOST EQUATION!
"...BUT THEY WERE PURSUED BY SIMIAN."
AFTER THAT, WE DON'T KNOW MUCH.
EXCEPT THAT TRUMBULL RESCUED THEM FROM THE GAME TOO SOON, LEAVING SIMIAN TRAPPED THERE.
...AND NOW SIMIAN HAS TAKEN CONTROL OF TRUMBULL'S ADVENTURE WORLD...
...AND THROUGH THAT, THE CENTRAL COMPUTER ITSELF!


NONE OF OUR MACHINES CAN OPERATE WITHOUT THE COMPUTER.
THOUGH STILL LOCKED INSIDE THE GAME, SIMIAN HAS BROUGHT THE CITY TO A STANDSTILL!
DAMN IT! WHY DOESN'T THE GOVERNMENT DO SOMETHING?

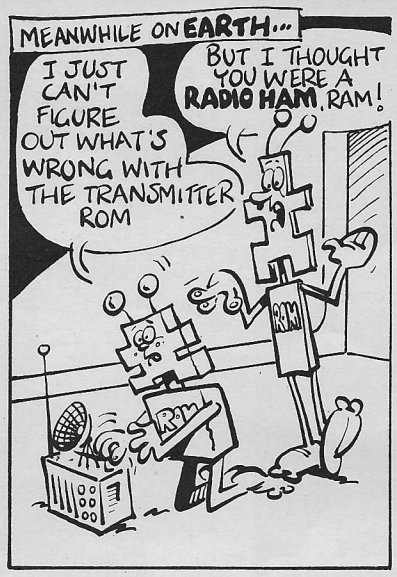

THE VOTE...
I VOTE WE GIVE THE BOY, MARK TO SIMIAN, IF THAT IS WHAT HE WANTS, AND GET ON WITH OUR LIVES!
CARRIED. I WILL TELL THEM.


JAN IS GIVEN THE TASK OF PERSUADING HER BROTHER TO RE-ENTER TRUMBULL'S WORLD.
I'M STILL NOT SURE I CAN HANDLE IT.
THINK, MARC. NOW HE CONTROLS THE COMPUTER, HE CAN DO ANYTHING.
MARC, WE WON'T AGREE UNLESS SIMIAN LETS ME SIT IN, HERE AT THE TERMINAL.

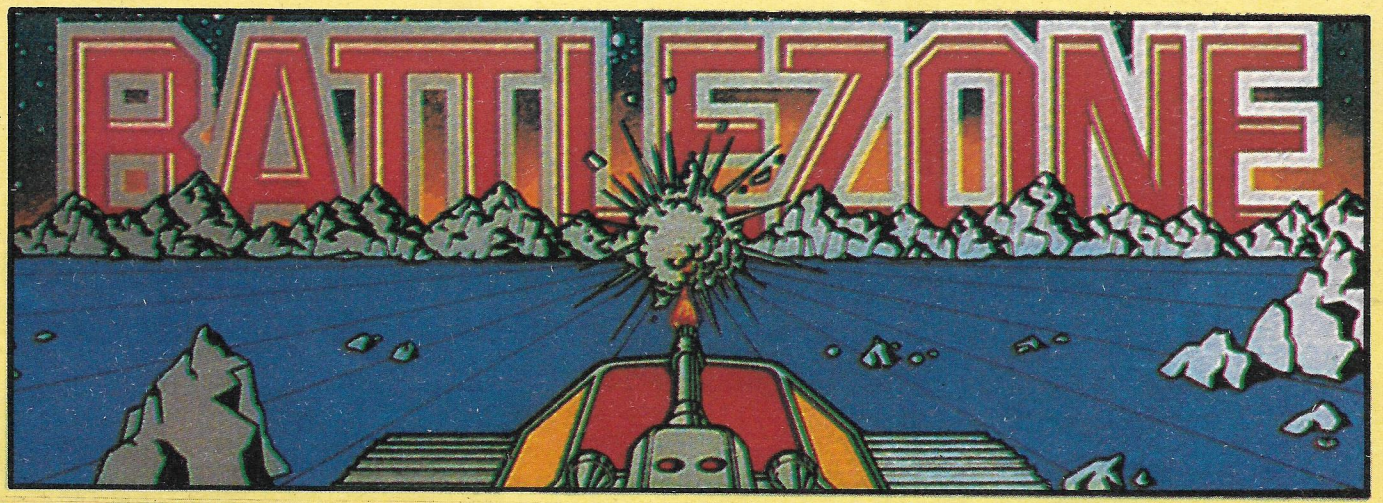

JAN IS DETERMINED...
OK, JAN, I'LL DO IT. BUT YOU'LL HAVE TO HELP ME!
WE CAN DEFEAT HIM, MARC! I DON'T KNOW HOW... BUT WE'LL FIND A WAY!
OK... LET'S GO.


EXCELLENT! I ACCEPT THE BOY. THIS TERMINAL NOW HAS ACCESS TO THE CPU.
QUICKLY, AND WE WILL DIGITISE YOU!
MARC FADES FROM REALITY...
I'LL BE WITH YOU, MARC! TRUST ME!
FALLING... FALLING.
TO DISCOVER, ON ARRIVAL, HOW MUCH TRUMBULL'S WORLD HAS CHANGED...'
IT'S COMPLETELY DIFFERENT. IT JUST LOOKS DEAD.
...AND TO DISCOVER THE EXTENT OF SIMIAN'S CORRUPTION!
NO! PLEASE GOD... NO!
WELCOME TO SIMIAN'S WORLD! WE ARE GOING TO PLAY A GAME, YOU AND I...
MARC FACES A WORLD HORRIBLY CHANGED... CAN JAN'S COMPUTER SKILLS SAVE HIM?

THE ADVENTURES OF ROM AND RAM




I HAVEN'T SEEN THIS SOFTWARE BEFORE...
WOW! THIS GAME IS BRILLIANT!
ERGG!
OOOAAAHHH!
NGGG!
UUUGGGHHH! I THINK I NEED TO GO TO THE BATHROOM
OH NO! HERE COMES THE HUMANOID WE ZAPPED WITH OUR FORCE FIELD
THOSE ARE THE UGLIEST COMPUTER CHARACTER'S I'VE EVER SEEN. I'LL FIX THEM.
ERASE
POP! POP!
GREAT JUMPING ANDROIDS, RAM, WE'RE INVISIBLE!!
WHO SAID THAT?
IT'S ANOTHER HUMANOID PLOT!
LET'S CALL ZILLYKON AND INFORM PIXEL OF WHAT HAS HAPPENED!
ON ZILLYKON...
ROM & RAM ARE ON LINE ON PIXEL. THEY SAY THEY'RE INVISIBLE!
TELL THEM I CAN'T SEE THEM!
BUT THEY INSIST...
INSIDE THE COMPUTER...
WE HAVE GRAVE NEWS, YOUR BRILLIANCE!
WE WISH TO REPORT THAT WE HAVE VANISHED!
FOOLS! I CAN SEE THROUGH YOU! ANYWAY WE ALREADY HAVE THAT DATA ON FILE - NOW RUN AWAY!
LATER
THIS NEW INVISIBLE SPACE INVADERS PROGRAM IS GREAT!
OW!
OUCH!
I JUST DON'T KNOW... OUCH... WHAT THE HUMANOIDS... OW... SEE IN THIS GAME ... OUCH!
ANDY ROBB
ROM & RAM MATERIALISE AGAIN IN THE NEXT PRINTOUT!



BATTLE ZONE, one of the first 3D games, is so realistic to play that the American Army bought 500 units for its mess halls to help soldiers attain higher reflex levels and sharper awareness. The game is set on a futuristic battlefield; the player sees a black screen with scenery outlined in green and objects similar in graphics to Asteroids.

The player views the action through special periscopic sights and movement in all directions is made easy by the use of two joystick controllers, one of which has a fire button on top. Looking through the sights the player has to line-up the enemy targets—tanks, supertanks, saucers and missiles—inside the cross wires and blast them into oblivion.

Tanks move about the play field and are easy to hit but as the score increases supertanks appear. They are similar to the ordinary tanks but move with greater speed and are more accurate. The strange missiles which appear from the sky behave in an alarming manner by zigzagging towards the player, and they must be destroyed just before impact, or destruction is certain. Saucers float harmlessly about the screen and should be picked-off to boost the score. Pyramids and blocks of various sizes are placed at random about the battlefield and can act as useful barriers to hide behind.

At the top of the screen there is a realistic radar scanner which shows the position of enemy tanks. To the left of the scanner the enemy position is stated clearly — left, right, behind, and so on.

It is easy to understand why the United States Army felt *Battle Zone* was valuable for recruits' free-time training.

Software

WATCH for the Atari VCS *Battlezone,* which features full colour graphics, to be released soon.

For the 48K Spectrum there is *Rommel's Revenge,* from Artic Computing.

Providing processor power to The Controller in publishing Load Runner were Bill Scolding (editor) and June Mortimer (administration). Chris Winch, Harold Mayes MBE, Nigel Clark, Terry Cartwright and Richard Hease linked into the system, Jenny Parrott, Cameron McDade, Akil Dhalla, Nicola, Rebecca, Richard and Eric Deeson contributed. The corporate might of ECC Publications of 196-200 Balls Pond Road, London N1 4AQ was utilised continually. Printout by Cradley Print PLC, Warley, West Midlands. Distributed by Spotlight Magazine Distribution Limited, 01-607 6411. ISSN 0264-8369.